CLAIMS:

What is claimed is:

1. An electronic watermarking system, for embedding additive information in digital data, for which one frame is defined as including N samples extracted from digital data and a current frame is defined as a frame that is overlapped by M samples ($0<M\leqq N/2$) of a preceding frame, comprising:

(1) a frequency domain transformation unit, for multiplying a frame extracted from digital data by a window function, and for using the results to perform a Fourier transform and thus obtain a frequency component for said digital data;

(2) a frequency domain embedding unit, for employing bit information for additive information, and a frequency band for said frequency component to change the amplitude of said frequency component in said digital data obtained by said frequency domain transformation unit;

(3) a time domain transformation unit, for performing an inverse Fourier transform to return, to a time domain signal, said frequency component whose amplitude has been changed by said frequency domain embedding unit; and

(4) an additive information embedding frame generator, for multiplying, by a window function, said time domain signal obtained by said time domain transformation unit, and for superimposing overlapped

frames to generate a frame wherein said additive information is embedded.

2. An electronic watermarking system according to claim 1, wherein, to change said amplitude of said frequency component of said digital data, said frequency domain embedding unit (2) employs bit information for additive information and the values of a mask, determined in advance in accordance with a frequency band, with which said frequency component is to be increased or decreased.

3. An electronic watermarking system according to claim 2, wherein the values of said mask corresponding to all the frequencies included in one frequency band are equalized.

4. An electronic watermarking system according to claim 2 or 3, wherein, as the frequency increases, the width of said frequency band is extended.

5. An electronic watermark detection system, for detecting additive information embedded in digital data, comprising:

(1) a frequency domain transformation unit, for multiplying a frame extracted from digital data by a window function, and for performing a Fourier transform to obtain a frequency component from said digital data;

(2) an amplitude storing unit, for obtaining amplitudes for said frequency components acquired by said frequency domain transformation unit, and for storing a

number of said amplitudes that equals a predetermined frame count;

(3) a cycle synchronization unit, for employing an amplitude value stored by said amplitude storing unit to designate a bit detection start frame; and

(4) a bit detector, for detecting bit information from embedded additive information beginning at said bit detection start frame obtained by said cycle synchronization unit.

6. An electronic watermark detection system according to claim 5, wherein said frequency domain transformation unit (1) uses the shorter length of said frame than the length when said additive information is embedded.

7. An electronic watermark detection system according to claim 5, wherein, in order to designate said bit detection start frame by referring to said amplitude values, said cycle synchronization unit (3) employs calculation results obtained by using the values of a mask that defines, in advance, a frequency component increase or decrease.

8. An electronic watermarking method, for embedding additive information in digital data, whereby one frame is defined as including N samples extracted from digital data, and a current frame is defined as a frame that is overlapped by M samples ($0<M\leqq N/2$) of a preceding frame, comprising the steps of:

(1) extracting one frame as a current frame from

digital data;

(2) multiplying said current frame by a window function;

(3) performing a Fourier transform for the resultant current frame to obtain a frequency component for said current frame;

(4) changing an amplitude of said frequency component in accordance with bit information for additive information;

(5) performing an inverse Fourier transform for the resultant frequency component;

(6) multiplying, by said window function, said frequency component obtained using said inverse Fourier transform; and

(7) adding an (N-M)-th sample, from the end of a preceding frame processed in the same manner as said steps (1) to (6), to an M-th sample, from the head of said current frame processed at said step (6), and generating one new frame including N samples.

9. An electronic watermarking method according to claim 8, wherein, at said step (4) of changing said amplitude of said frequency component, said amplitude is changed by employing bit information for additive information and the values of a mask, determined in advance in accordance with a frequency band, with which said frequency component is to be increased or decreased.

10. An electronic watermarking method according to claim 9, wherein the values of said mask corresponding to all